Keysight Technologies
Automating 14565B Software Battery Drain Measurements with National Instruments LabVIEW

Application Note

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Introduction

The demand for measuring, validating, and analyzing battery drain is growing due to greater power consumption of the latest generation of higher performance mobile wireless devices. Manually setting up test conditions and making corresponding battery drain measurements is overly time consuming. The advantages of having a flexible software and hardware platform for automating battery drain measurements include drastically reducing test time and improving repeatability, among other things. Finding an existing solution tailored for this application provides such advantages without the need for extensive test software development.

Problem

Creating a flexible software platform for battery drain measurement and analysis requires considerable development effort that takes many months or longer. Popular client programs such as the Keysight Technologies, Inc. VEE or National Instruments LabVIEW assist by reducing test development time. Being generic test executives however, they still require a great deal of programming to tailor them into an optimized automated solution for the task of battery drain measurement and analysis.

Solution

The Keysight 14565B software is specifically tailored for battery drain measurement and analysis. It can now be automated from many other software programs and environments, greatly accelerating wireless mobile device battery drain testing. In particular, the Keysight 14565B software can be called and controlled from National Instruments LabVIEW using ActiveX controls to create a flexible and capable automated battery drain test platform without having to develop a lot of custom code. An ActiveX control is a COM (common object model) object that is used to link software components to build and automate applications.

– The Keysight 14565B software works in conjunction with the Keysight 66319B/D or 66321B/D Mobile Communications DC Sources as a ready-to-use specialized solution for long term current drain data logging and storage, visualization of results, and performing detailed analysis for device optimization.

– The 66319B/D and 66321B/D feature battery emulation sourcing characteristics and multiple current measurement ranges for microampere to ampere levels. These capabilities assure accurate battery drain test results.

– With 14565B software automation control, several different battery drain tests can be automatically run together in sequence and results saved. This eliminates the need for manual intervention to set up and run each test individually.

– With 14565B software automation control, battery drain measurements can be automated in combination with RF, digital and other stimulus and measurements on the mobile device, using the appropriate test equipment. A flexible and capable automated test platform is created without resorting to extensive programming.
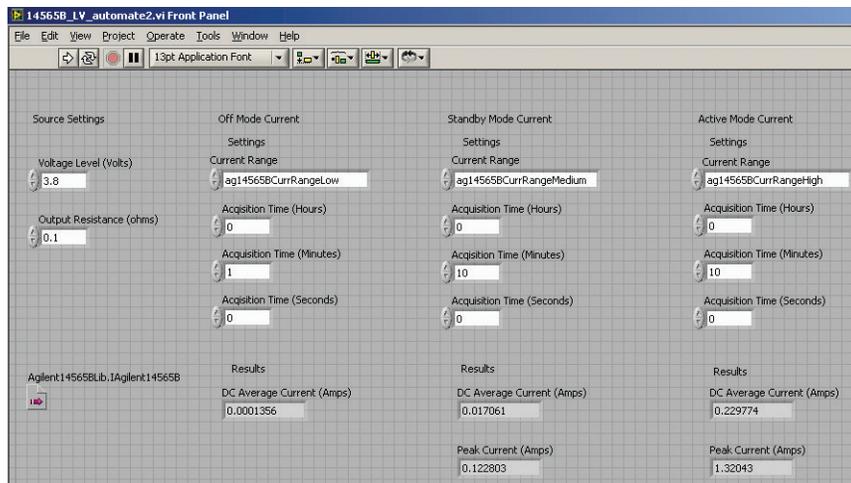

Figure 1. LabVIEW front panel for 14565B battery drain test automation example

14565B test sequence automation example in National Instruments LabVIEW

To illustrate using ActiveX control to automate 14565B battery drain testing, a test was quickly constructed in LabVIEW to measure and display a mobile phone's off-, standby-, and talk-mode current drains, as shown in Figure 1. Once the source and measurement test parameters are set, the operator only needs to press the LabVIEW run button (arrow) and start up the mobile phone when prompted by the program.

To initiate a program sequence from LabVIEW using ActiveX control, an Automation Refnum (Reference Number) has to be created as a unique identifier for this COM object. The Automation Refnum is an ActiveX object class "Keysight 14565B."

A section of LabVIEW code shown in Figure 2 opens the automation using an ActiveX Automation Open icon. It is followed by ActiveX Invoke Nodes that send 14565B automation commands that set up the Keysight DC source through the 14565B software.

The code sections for making the off-, standby- and active-mode current measurements displayed in the front panel in Figure 1 are all virtually identical. The code section for the active-mode measurement is shown in Figure 3. A conditional "while loop" is inserted after initiating the measurement to pause program execution until the measurement is finished and ready to be returned by the Keysight DC source. At the end of the program an ActiveX Close icon closes this instance of automation. Additional details on using ActiveX controls to automate the 14565B software from National Instruments LabVIEW are provided in Keysight's 14565B's Programming Guide.
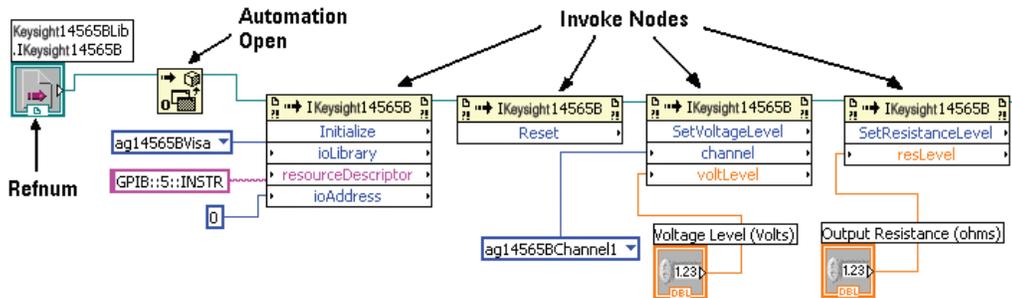

Figure 2. LabVIEW block diagram section of code creating a Refnum, opening automation, and setting the Keysight DC source with the Keysight 14545B software
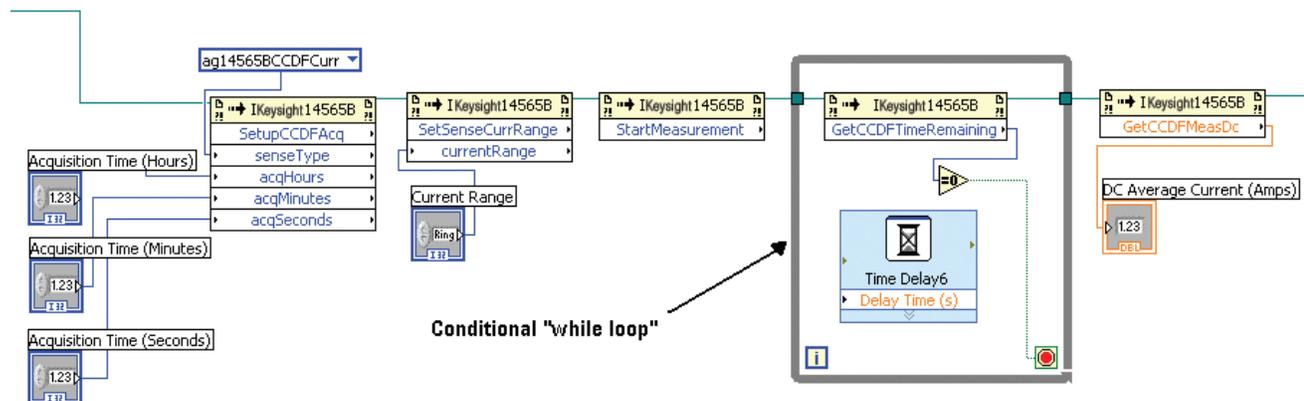

Figure 3. LabVIEW block diagram section of code automating battery drain measurement using the Keysight 14565B software

Summary of Results

With the Keysight 14565B software it is now possible to quickly and easily set up a flexible and capable test platform for automating device stimulus and settings in combination with making advanced battery current drain measurements. A generic test executive client program such as National Instruments LabVIEW shown here reduces test development time by automating control of the RF, digital and other test condition stimulus and settings. By making ActiveX control calls from LabVIEW to the Keysight 14565B software, automated advanced battery current drain measurements and analysis are readily implemented as well, eliminating the need to spend many months developing such application-specific software on one's own.

Related Applications

- Wireless PCMCIA network card testing
- Wireless mobile device application software regression testing
- Setting specifications for wireless mobile device battery current drain
- Wireless mobile device use-model operating time benchmarking

Related Products

- 14565B Device Characterization Software
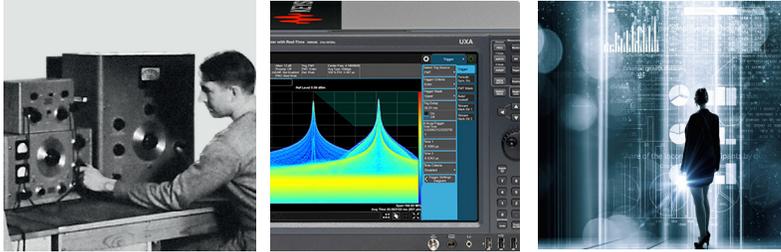- 66319B/D or 66321B/D Mobile Communications DC Sources

Related Literature

- *Selecting the right switch technology for your application*, **5989-5189EN**
- *Video Leakage Application Note*, **5989-6086EN**

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